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IS 14813 (2000): Automotive Vehicles - Air Horns [TED 11: Automotive Electrical Equipment]

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भारतीय मानक

स्वचल वाहन — एअर हॉर्न — विशिष्टि

Indian Standard

AUTOMOTIVE VEHICLES — AIR HORNS — SPECIFICATION

ICS 43.040.20

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BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002

October 2000 Price Group 3

Automotive Electrical Equipment Sectional Committee, TED 11

FOREWORD

This Indian Standard was adopted by the Bureau of Indian Standards, after the draft finalized by the Automotive Electrical Equipment Sectional Committee, had been approved by the Transport Engineering Division Council.

Horn is an essential safety feature fitment on all vehicles. Rule 119 of the Central Motor Vehicle Rules (CMVR) covers the fitment of monotone horns on motor vehicles. This Indian Standard is intended to cover the requirements of horns operated by compressed air generated by a compressor and used on commercial and transport vehicles. To keep the noise pollution level of the environment within limits, the use of multi-toned horns giving a succession of different notes or unduly harsh, shrill, loud or alarming noise is prohibited under the rules. Keeping this in view, only low intensity air horns with sound pressure level of 100 to 110 dB(A) within the frequency band of 1 800 to 3 550 Hz are covered in this standard.

Electric horns for use in automotive vehicles including those intended for two and three wheelers is covered separately in IS 1884 : 1993 'Automotive vehicles — Electric horns — Specification (*third revision*)'.

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

AMENDMENT NO. 1 SEPTEMBER 2006
TO
IS 14813 : 2000 AUTOMOTIVE VEHICLES — AIR HORNS — SPECIFICATION

(*Page* 4, *clause* **7.5.1**) — Substitute '4 l/s' *for* '2 l/min'.

(TED 11)

Reprography Unit, BIS, New Delhi, India

Indian Standard

AUTOMOTIVE VEHICLES — AIR HORNS — SPECIFICATION

1 SCOPE

1.1 This standard covers the basic mechanical, pneumatic and acoustical requirements and methods of test for air horns for automobiles.

1.2 This standard does not cover bulb type of horns.

2 REFERENCES

The following standards contain provisions which through reference in this text, constitute provision of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision, and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below:

IS No.	*Title*
269 : 1989	33 grade ordinary portland cement (*fourth revision*)
1884 : 1993	Automotive vehicles — Electric horns (*third revision*)
9000	Basic environmental testing procedur for electronic and electrical items
(Part 2/Sec 1 to 4) : 1977	Cold test (Sections 1 to 4 in one volume)
(Part 3/Sec 1) : 1977	Dry heat test (Section 1)
(Part 5/Sec 1) : 1981	Damp heat (cyclic) test, Section 1 16 + 8 h cycle
(Part 5/Sec 2) : 1981	Damp heat (cyclic) test, Section 2 12+12 h cycle
(Part 16) : 1983	Driving rain test
9779 : 1981	Sound level meters
10250 : 1982	Severities for environmental tests for automotive electrical equipment

3 TERMINOLOGY

For the purpose of this standard the following definitions shall apply.

3.1 Air Horn

A horn designed to operate by compressed air.

3.2 Working Pressure

It is the range of pressure recommended for the working (operations) of an air horn by the manufacturer and as marked on it.

3.3 Mounting Arrangement

The means of fixing the air horn on the vehicle.

3.4 Type Tests

Test carried out to prove conformity with the specification. These are intended to prove the general qualities and design of a given type of air horn.

3.5 Acceptance Tests

Tests carried out on the samples taken from the lot for the purpose of acceptance of the lot.

3.6 Routine Tests

Tests carried out on each air horn to check requirements which are likely to vary during production.

4 GENERAL REQUIREMENTS

4.1 Materials

Air horns shall be constructed from suitable materials free from any flaws.

4.2 Workmanship

Workmanship shall be in accordance with relevant engineering practices.

4.3 Finish

All metallic surfaces liable to rust and corrosion shall be suitably treated for resistance against corrosion and rust.

4.4 Tamper Proofing

Tamper proofness of the horn shall be achieved by making a capsule consisting of sound generating mechanism such as diaphragm spring, cover, retainer ring, etc, as one unit by adopting such techniques as ultrasonic welding or any other means such that any attempt made to tamper the capsule to replace the individual component or components of the capsule makes it unfit for further use.

4.5 Sound Pressure Level

The sound pressure level of air horn when tested as per the test method given in **7.3** shall be 100 to 110 dB(A) within a frequency band of 1 800 to 3 550 Hz.

5 DIMENSIONS

5.1 Overall Dimensions

The overall dimensions shall be suitable for particular application.

5.2 Fixing

The horns shall be mounted rigidly to the vehicle.

5.2.1 The control switches for the horns shall be mounted at suitable places easily accessible to the driver of the vehicle.

6 SAMPLING

6.1 A recommended plan on sampling for acceptance tests and the criterion for conformity is given in **6.1.1** to **6.1.3**.

6.1.1 If statistical quality control techniques have been used for production control such test results and relevant charts may be made available along with the material supplied to enable the purchaser to judge the acceptability or otherwise of a lot. In case such information is not available, the following procedure is recommended for judging conformity of a lot with the requirements of this specification.

6.1.2 *Scale of Sampling*

6.1.2.1 *Lot*

In any consignment, all the horns of the same size and type and from the same batch of manufacture shall be grouped together to constitute a lot.

6.1.2.2 The number of horns to be selected from a lot shall depend upon the lot size and shall be in accordance with col 1 and 2 of Table 1.

Table 1 Size of Sample and Criterion for Conformity

Lot Size N (1)	Sample Size n (2)	Permissible Number of Defectives (3)
51 to 150	5	0
151 to 300	13	1
301 to 500	20	1
501 to 1 000	32	2
1 001 and above	50	3

NOTE — For the lot size up to 50, the sample size and the permissible number of defectives shall be as agreed upon between the manufacturer and the purchaser.

6.1.2.3 These horns shall be selected at random. In order to ensure randomness, the following procedure may be adopted:

Arrange the horns in a systematic manner and starting from any horn count them as 1,2,...... etc, up to r, r being equal to the integral part of N/n, N being the lot size and n the sample size. Every r'th horn shall be included in the sample.

6.1.3 *Number of Tests*

6.1.3.1 All the horns selected under **6.1.2.2** shall be subjected to acceptance tests.

6.1.4 *Criterion for Conformity*

6.1.4.1 A lot shall be considered as conforming to this specification, if the number of horns out of those tested, failing to satisfy the requirements of any one or more of acceptance tests, does not exceed the corresponding number given in col 3 of Table 1.

7 TESTS

7.1 Classification of Tests

7.1.1 *Type Tests*

The following shall constitute type tests:

a) Visual examination (*see* **7.2**),
b) Sound pressure level test (*see* **7.3**),
c) High pressure test (*see* **7.4**),
d) Air consumption test (*see* **7.5**),
e) Operating pressure range test (*see* **7.6**),
f) Damp heat (cycling) test (*see* **7.7**),
g) Corrosion resistance test (*see* **7.8**),
h) Thermal stability test (*see* **7.9**),
j) Continuous operation test (*see* **7.10**),
k) Endurance test (*see* **7.11**),
m) Dust test (*see* **7.12**), and
n) Vibration test (*see* **7.13**).

7.1.2 *Sequence of Tests or Type Approval*

7.1.2.1 *Criteria for approval*

The specimen of test for type approval is as siven in Table 2.

At least nine samples shall be submitted for testing together with the relevant data. These shall be tested according to the sequence of tests given in **7.1.2**. The testing authority shall issue a type approval certificate if the horns are found to comply with the requirements of tests given in **7.1.1**.

7.1.2.2 In case of failure in one or more type test, the testing authority may call for fresh samples not exceeding twice the number of original samples and subject them to the test(s) in which failure occurred. If in repeat test(s) no failure occurs, the tests may be considered to have been satisfied.

Table 2 Sequence of Tests for Type Approval

(*Clause* 7.1.2.1)

Test	Number of Samples								
	1	2	3	4	5	6	7	8	9
Visual examination	x	x	x	x	x	x	x	x	x
Sound pressure level test	x	x	x	x	x	x	x	x	x
High pressure test	x	x	x	x	x	x	x	x	x
Air consumption test	x	x	x	x	x	x	x	x	x
Operating pressure. range test	x	x	x	x	x	x	x	x	x
Damp heat (cycling) test			x						
Corrosion resistance test				x					
Thermal stability test					x				
Continuous operation test						x			
Endurance test							x	x	x
Dust test	x								
Vibration test		x							

7.1.3 *Acceptance Tests*

The acceptance tests shall constitute the following:

a) Visual examination (*see* **7.2**),
b) Sound pressure level test (*see* **7.3**),
c) High pressure test (*see* **7.4**),
d) Air consumption test (*see* **7.5**), and
e) Operating pressure range test (*see* **7.6**).

7.1.4 *Routine Tests*

The following shall constitute routine tests:

a) Visual examination (*see* **7.2**),
b) Air consumption test (*see* **7.4**), and
c) Operating pressure range test (*see* **7.5**).

7.2 Visual Examination

The horns shall be examined for external finish and workmanship. They shall have good finish and no sharp corners.

7.3 Sound Pressure Level Test

7.3.1 *Mounting of the Horn*

The horn to be tested shall be mounted in the manner specified by the manufacturer and in any case it shall be fixed in a rigid manner on a base whose mass shall be ten times that of the horn being tested and not less than 15 kg.

7.3.2 Pressure shall be maintained at 700 ± 25 kPa (7 ± 0.25 kgf/cm^2) during the test.

7.3.3 This test may be carried out under the prevailing atmospheric conditions and the level of the background noise shall be such that the reading indicated on the meter by the background noise is at least 10 dB (A) below that produced by the horn under test (*see* Note under **7.3.6** for reference level). This test may be carried out either in an anechoic room or in an open space in which there is no obstacle within a radius of 12 m and there shall be no acoustical focusing effects or nearby parallel walls, the horn being mounted 1.2 m above the ground and directed horizontally.

7.3.4 The horn shall be mounted in such a manner that the sound waves emitted from the horn are directed towards the microphone of the sound level meter in the horizontal plane. The microphone shall be placed in such a manner that it is on the axis of the radiating horn and that of the sound waves are incident, parallel to the diaphragm. For this test, weighing network curve A shall be used on the sound level meter (*see also* IS 9779).

7.3.5 The distance between the flare plane and the center of microphone shall be 200 ± 1 cm. The microphone shall be adjusted side ways or up and down to obtain the highest possible meter reading.

7.3.6 The measured sound pressure level of the horn shall be within 100 dB (A) to 110 dB (A).

NOTE — The values for sound pressure level value is expressed in relation to 2×10^{-5} N/m^2 (rms) weighted in accordance with the curve 'A' and expressed in dB (A).

7.3.7 The sound pressure level within the frequency band of 1 800 to 3 550 Hz shall be greater than that of each component of a frequency exceeding 3 550 Hz and in any case equal to or greater than 100 dB(A).

7.4 High Pressure Test

The horn shall be subjected to 1.5 times the working pressure but not more than 1 000 kPa (10 kg/cm^2) for a period of one minute. It shall not show any signs of failure and shall meet the requirements of operating pressure range test.

7.5 Air Consumption Test

The horn shall be operated at its working pressure 700 ± 25 kPa (7 ± 0.25 kg/cm^2) and the air consumption shall be noted.

7.5.1 The maximum air consumption shall not exceed 2 l/min.

7.6 Operating Pressure Range Test

The horn at ambient temperature shall be capable of giving clear note at its working pressure range of 400 to 800 kPa (4 kg/cm^2 to 8 kg/cm^2). During the test the sound pressure level will not exceed the values specified in **7.3.6**.

7.7 Damp Heat (Cycling Test)

7.7.1 The damp heat (cycling) test shall be carried out according to IS 9000 (Part 5/Sec 1 and 2). The number of conditioning cycles and recovery period shall be 7 and 24 h respectively.

7.7.2 After completion of the test the horn shall be subjected to the sound pressure level test (*see* **7.3**). The sound pressure level shall not deteriorate by more than 5 dB (A) from the initial value and shall not be less than the minimum value specified in **7.3.6**.

7.8 Corrosion Resistance Test

The test for corrosion resistance of the horn shall be carried out in the manner specified in **4.8** of IS 10250.

7.8.1 After removal from the salt spray chamber, the horn shall not show any sign of corrosion or electrolytic action.

7.8.2 *Assessment of Results*

After removal from the salt spray, that is, within two hours after draining and again when tested 24 h later, the horn shall be subjected to the sound pressure level test and shall satisfy the requirements of that test (*see* **7.3**). The depreciation in the sound pressure level shall not deteriorate by more than 5 dB (A) from the initial value and shall not be less than the minimum value specified in **7.3.6**.

7.9 Thermal Stability Test

The following tests shall be performed on horns:

a) Dry heat test, and

b) Cold test.

7.9.1 *Dry Heat Test*

This test is intended to determine suitability of equipment to withstand high temperature severities which are likely to be encountered when mounted on a vehicle. The test shall be conducted as specified in IS 9000 (Part 3/Sec 1).

The equipment shall be tested for high temperature use at the following conditions:

	Group 2
Temperature, °C	90/55
Duration of exposure, hours	4/16

7.9.2 *Cold Test*

This test is intended to determine the suitability of the equipment at the specified low temperature likely to be encountered when mounted on a vehicle. The test shall be conducted as specified in IS 9000 (Part 2/Sec 1 to 4).

The test shall be conducted for low temperature use at the following conditions:

Temperature, °C	–10
Duration of exposure, hours	2

7.10 Continuous Operation Test

With the applied pressure of 700 ± 100 kPa (7 ± 1.0 kgf/cm^2) the horns shall be continuously operated for a period of 15 min. On completion of the time period the horn shall be subjected to the sound pressure level test and it shall satisfy the requirement.

7.10.1 After the test the horn shall be subjected to the sound pressure level test (*see* **7.3**). The sound pressure level shall not deteriorate by more than 5 dB (A) from the initial value and shall not be less than the minimum value specified in **7.3.6**.

7.11 Endurance Test

The horn shall be suitably mounted and operated continuously for 1 00 000 blasts without any change in volume and tone throughout the test with two seconds on time and two seconds off time.

7.11.1 During this test, pressure shall be maintained at 700 ± 100 kPa (7±1.0 kgf/cm^2).

7.11.2 The horn, after being subjected to this test, shall be tested for sound pressure level test (*see* **7.3**). The change in sound level after the endurance test shall not exceed 5 dB (A) from that measured before the endurance test and shall be within the range specified in **7.3.6**.

7.12 Dust Test

A sample unit with all the drain holes closed shall be mounted in its normal operating position, 150 mm from the wall, in a box measuring 900 mm × 900 mm, containing 5 kg of fine powdered cement conforming to IS 269. At intervals of 15 min this dust shall be agitated by compressed air or fan blower by projecting blasts of air for a two-second period in a downward direction into the dust in such a way that the dust shall be completely and uniformly diffused throughout the entire box. The dust is then allowed to settle. This test shall be continued for 5 h.

7.12.1 After this test, the exterior surface shall be cleaned and the sound pressure level test shall be carried out (*see* **7.3**). The deterioration of sound pressure level shall not exceed 5 dB(A) from that measured before this test and shall be within the range specified in **7.3.6**.

7.13 Vibration Test

The horn after being rigidly mounted on a suitable vibration machine constructed to produce a simple harmonic motion shall be subjected to vibration of amplitude 0.75 mm (peak to peak 1.5 mm) through a frequency range of 10-55-10 Hz over a period of one minute. With continuously varying frequencies the vibration shall be applied for not less than one hour in each of the three major axes of the horn. At the end of the vibration test the horn shall be subjected to the sound pressure level test (*see* **7.3**). The deterioration in the sound pressure level shall not exceed 5 dB (A) from that measured before this test and shall be within the range specified in **7.3.6**.

8 MARKING

8.1 Each horn shall be marked with the following information:

a) Trade-mark or name of the manufacturer,
b) Working pressure, and
c) Any other marking as agreed between the purchaser and the manufacturer.

8.2 BIS Certification Marking

8.2.1 The product may also be marked with Standard Mark on its capsule containing the sound generating mechanism.

8.2.2 The use of the Standard Mark is governed by the provisions of *Bureau of Indian Standards Act*, 1986 and the Rules and Regulations made thereunder. The details of conditions under which the licence for the use of Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

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Amendments Issued Since Publication

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